



United States Department of Agriculture

# **Pueblo Ridge Restoration Project**

## **Errata to the Final Environmental Assessment**

**Carson National Forest, Camino Real Ranger District**

**Taos County, New Mexico**



Forest Service Carson National Forest Camino Real Ranger District November 2020

# **Pueblo Ridge Restoration Project Environmental Assessment**

## **Errata Sheet November 2020**

The Pueblo Ridge Restoration Project Final Environmental Assessment (EA) was released in May 2020. This errata sheet documents correction to the text of the published EA, and should be reviewed along with the final EA. These corrections reflect instruction provided by the Objection Reviewing Officer in multiple letters dated September 21, 2020. These corrections are consistent with direction provided in Forest Service handbook 1909.15, Chapter 10, Section 18. There are no changes to the project or significant new circumstances identified in this errata sheet that affect the analysis and conclusions in the Pueblo Ridge Restoration Project Final Environmental Assessment.

## **Errata**

The errata contained in this document pertains to multiple points of clarification of various topics throughout the assessment. The points of clarification will be made by topic area.

## **Clarification as to why the Environmental Assessment does not analyze a No Action Alternative.**

**Page 1, section entitled “Format of this Environmental Assessment”.** This section is updated as follows:

~~The Council on Environmental Quality regulations define an environmental assessment as:~~

~~“A concise public document that serves to “briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact (FONSI).”~~

~~This environmental assessment does not include sections that are not required in an environmental document but have historically been included: National Environmental Policy Act process language, irreversible and irretrievable commitment section, extensive list of existing conditions or standards and guidelines from the forest plan, a list of preparers, and a no action alternative.~~

~~This environmental assessment does not include a no action alternative because existing baseline conditions as described below convey the extent to which the project area is departed from desired conditions, which are based on best available science and historical ranges for measures of forest integrity such as stand density, species composition, forest structure, and fire hazard. Therefore, it was determined the purpose and need of the project is adequately supported without the analysis of a no action alternative. Additional documentation, including more detailed analyses of project area resources, may be found in the project planning record, which is available upon request.~~

The Council on Environmental Quality regulations define an environmental assessment as:

“A concise public document that serves to “briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact (FONSI).”

This document is consistent with the direction set forth in the Code of Federal Regulations regarding the requirements for an Environmental Assessment (40 CFR 1502.14(c)). This environmental assessment does not include sections that are not required but have historically been included: National Environmental Policy Act process language, irreversible and irretrievable commitment section, extensive list of existing conditions or standards and guidelines from the forest plan, a list of preparers, and a no-action alternative

A no-action alternative was not included because existing baseline conditions as described below convey the extent to which the project area is departed from desired conditions, which are based on best available science and historical ranges for measures of forest integrity such as stand density, species composition, forest structure, and fire hazard. Therefore, it was determined the purpose and need of the project is adequately supported without the analysis of a no-action alternative. Additional documentation, including more detailed analyses of project area resources, may be found in the project planning record, which is available upon request.

## Clarification of the differences between the two alternatives.

Page 16, Section entitled “Comparison of Alternatives”. This section is updated as follows:

Table 1. Differences in alternatives

Activities	Alternative 1, Proposed Action, Forest Plan Amendments	Alternative 2, No Forest Plan Amendments
Amendment	Incorporate best available science for restoration in frequent fire forests (Reynolds et al. 2013), including management direction in the revised Mexican spotted owl recovery plan and clarifying language for northern goshawk management.	No amendment
Amendment	Provide for ground-based steep-slope treatments on slopes greater than 40 percent and less than or equal to 75 percent gradient.	No amendment
Mechanical treatment utilizing conventional ground-based equipment such as feller-bunchers and skidders, conventional non-ground-based equipment (skyline yarders), harvesters and forwarders, masticators, and equipment such as excavators.	9,709 acres (entire project area)	9,709 acres (2,910 acres with slopes greater than 40 percent would rely solely on the proposed road construction and skyline yarders to be mechanically treated)
Mastication treatments (including boom-mounted masticators)	9,709 acres	6,799 acres

<b>Activities</b>	<b>Alternative 1, Proposed Action, Forest Plan Amendments</b>	<b>Alternative 2, No Forest Plan Amendments</b>
Hand thinning (to include fuelwood availability)	9,700 acres	6,799 acres
Chipping and biomass mastication in conifer and oak areas (fuel treatment)	9,700 acres	6,799 acres
Riparian Restoration	Up to 10.5 miles	Up to 10.5 miles
New permanent road construction	0 miles	Up to 5 miles
Temporary road construction	Up to 5 miles	Up to 5 miles
Decommissioning of roads	13 miles minimum	13 miles minimum
Spring developments (range improvements)	9	4
Guzzlers	2	2
Corrals	4	4

**Table 3. Differences in alternatives**

<u>Activities</u>	<u>Alternative 1, Proposed Action, Forest Plan Amendments</u>	<u>Alternative 2, No Forest Plan Amendments</u>
<u>Amendment</u>	<u>Incorporate best available science for restoration in frequent-fire forests (Reynolds et al. 2013), including management direction in the revised (2012) Mexican spotted owl recovery plan and clarifying language for northern goshawk management.</u>	<u>No amendment</u>  <u>Will follow management direction with in the 1996 Mexican spotted owl recovery plan.</u>
<u>Amendment</u>	<u>Provide for ground-based steep-slope treatments on slopes greater than 40 percent and less than or equal to 75 percent gradient.</u>	<u>No amendment</u>
	<u>This would allow for mechanical thinning to occur on up to 2,921 acres.</u>	<u>Hand thinning of up to 2,921 acres.</u>
	<u>Removal of thinned material and biomass could be removed from the site using mechanical means such as a forwarder.</u>	<u>Removal of thinned material could be removed via a skyline yarder, or left on-site to be treated with hand piling and burning activities.</u>
<u>Mechanical treatment utilizing conventional ground-based equipment such as feller-bunchers and skidders, conventional non-ground-based equipment (skyline yarders), harvesters and forwarders, masticators, and equipment such as excavators.</u>	<u>9,709 acres (entire project area)</u>	<u>9,709 acres (2,910 acres with slopes greater than 40 percent would rely solely on the proposed road construction and skyline yarders to be mechanically treated)</u>
<u>Mastication treatments (including boom-mounted masticators)</u>	<u>9,709 acres</u>	<u>6,799 acres</u>
<u>Hand thinning (to include fuelwood availability)</u>	<u>9,709 acres</u>	<u>6,799 acres</u>
<u>Chipping and biomass mastication in conifer and oak areas (fuel treatment)</u>	<u>9,709 acres</u>	<u>6,799 acres</u>
<u>Riparian Restoration</u>	<u>Up to 10.5 miles</u>	<u>Up to 10.5 miles</u>
<u>New permanent road construction</u>	<u>0 miles</u>	<u>Up to 5 miles</u>
<u>Temporary road construction</u>	<u>Up to 5 miles</u>	<u>Up to 5 miles</u>
<u>Decommissioning of roads</u>	<u>13 miles minimum</u>	<u>13 miles minimum</u>

<u>Activities</u>	<u>Alternative 1, Proposed Action, Forest Plan Amendments</u>	<u>Alternative 2, No Forest Plan Amendments</u>
<u>Spring developments (range improvements)</u>	<u>9</u>	<u>4</u>
<u>Guzzlers</u>	<u>2</u>	<u>2</u>
<u>Corrals</u>	<u>1</u>	<u>1</u>

## Clarification of the Management Indicator Species.

Pages 74, section entitled “Species Considered for this Analysis”. This section was updated as follows:

~~A list of threatened, endangered, and proposed species to consider for the Pueblo Ridge Project was obtained from the U.S. Fish and Wildlife Service Information, Planning, and Conservation System (U.S. Fish and Wildlife Service 2020). Five species were reviewed for known or potential occurrence within the project area (Error! Reference source not found.). Mexican spotted owl and Canada lynx are the only two listed species carried forward for further analysis. Twenty-five species on the Southwestern Region sensitive species list (USDA Forest Service 2013) are applicable to the Camino Real Ranger District and were also reviewed (Error! Reference source not found.). Of these, nine were carried forward for further analysis. Error! Reference source not found. also provides a final determination resulting from the analysis. In addition to the analyses for Mexican spotted owl and Canada lynx, a detailed analysis for northern goshawk is provided in this document to show application and consistency with project design features. Detailed analysis for the remaining eight sensitive species, as well as analysis for management indicator species and migratory birds, is provided in the “Wildlife” report, available in the project record.~~

A list of threatened, endangered, and proposed species to consider for the Pueblo Ridge Project was obtained from the U.S. Fish and Wildlife Service Information, Planning, and Conservation System (U.S. Fish and Wildlife Service 2020). Five species were reviewed for known or potential occurrence within the project area (Error! Reference source not found.). Mexican spotted owl and Canada lynx are the only two listed species carried forward for further analysis. Twenty-five species on the Southwestern Region sensitive species list (USDA Forest Service 2013) are applicable to the Camino Real Ranger District and were also reviewed (Error! Reference source not found.). Of these, nine were carried forward for further analysis. Error! Reference source not found. also provides a final determination resulting from the analysis. In addition to the analyses for Mexican spotted owl and Canada lynx, a detailed analysis for northern goshawk is provided in this document to show application and consistency with project design features. Eleven management indicator species applicable to the Camino Real Ranger District. Of the eleven, eight species were carried forward for further analysis (table 19). Detailed analysis for all wildlife species considered, including migratory birds, is provided in the “Wildlife” report, available in the project record.

Page 76, section entitled “Species Considered for this Analysis”. Insertation of the Management indicator species table. This section was updated as follows:

Table 19. Management indicator species considered for this analysis

<u>Management Indicator Species</u>	<u>Key habitat component</u>	<u>Habitat Occurrence</u>	<u>Comments/Determination</u>
<b><u>Birds (5)</u></b>			
<u>Brewer's sparrow</u> <u>(<i>Spizella breweri</i>)</u>	<u>Sagebrush</u>	<u>not present</u>	<u>The project area lacks sagebrush habitat. This project would not affect forest-wide habitat and population trends.</u>
<u>plain (juniper) titmouse</u> <u>(<i>Baeolophus ridgwai</i>)</u>	<u>Piñon/juniper canopies</u>	<u>present</u>	<u>Analysis required. Refer to the 2.5.6 Management Indicator Species section below.</u>
<u>white-tailed ptarmigan</u> <u>(<i>Lagopus leucurus</i>)</u>	<u>Alpine tundra and subalpine deciduous shrub</u>	<u>not present</u>	<u>Treatment areas are below alpine tundra and subalpine deciduous shrub zones (10,500 feet). This species was also analyzed in the Biological Evaluation section of this document. Alternatives 1 and 2 would not affect forest-wide habitat and population trends</u>
<u>hairy woodpecker</u> <u>(<i>Picoides villosus</i>)</u>	<u>snags</u>	<u>present</u>	<u>Analysis required. Refer to the 2.5.6 Management Indicator Species section below.</u>
<u>wild turkey (<i>Meleagris gallopavo</i>)</u>	<u>old growth pine</u>	<u>present</u>	<u>Analysis required. Refer to the 2.5.6 Management Indicator Species section below. Refer to the Potential for Effects section.</u>
<b><u>Mammals (4)</u></b>			
<u>Rocky mountain bighorn sheep (<i>Ovis canadensis canadensis</i>)</u>	<u>alpine, subalpine tundra and mountain meadow grassland</u>	<u>not present</u>	<u>Treatment areas are below alpine and subalpine tundra biotic zones and do not include areas of high elevation grassland. Therefore, alternatives 1 and 2 would not affect forest-wide habitat and population trends.</u>
<u>Abert's squirrel (<i>Sciurus aberti</i>)</u>	<u>Interlocking canopies in ponderosa pine</u>	<u>present</u>	<u>Analysis required. Refer to the 2.5.6 Management Indicator Species section below.</u>
<u>red squirrel (<i>Tamiasciurus hudsonicus</i>)</u>	<u>Mixed conifer</u>	<u>present</u>	<u>Analysis required. Refer to the 2.5.6 Management Indicator Species section below.</u>
<u>Rocky Mountain elk (<i>Cervus elaphus nelsoni</i>)</u>	<u>General forest</u>	<u>present</u>	<u>Analysis required. Refer to the 2.5.6 Management Indicator Species section below.</u>
<b><u>Aquatic species (2)</u></b>			
<u>resident trout</u>	<u>perennial stream, riparian vegetation</u>	<u>present</u>	<u>Analysis required. The Rio Grande Cutthroat Trout was already analyzed within the Biological Evaluation section of this document. Therefore, this analysis only includes the Rainbow Trout (<i>Oncorhynchus mykiss</i>) and Brown Trout (<i>Salmo trutta</i>). Refer to the 2.5.6 Management Indicator Species section below.</u>
<u>aquatic macroinvertebrates</u>	<u>perennial stream, riparian vegetation</u>	<u>present</u>	<u>Analysis required. Refer to the 2.5.6 Management Indicator Species section below.</u>

# Clarification of the Mexican Spotted Owl habitat components for Alternative 1.

Pages 10, section entitled “Vegetation and Fuels Treatment, Alternative 1”. This section was updated as follows:

## ~~Alternative 1~~

~~Forest thinning treatments on 9,709 acres would utilize conventional ground-based equipment such as feller-bunchers and skidders, conventional non-ground-based equipment (for example, skyline yarders), harvesters, and forwarders, including those capable of operating on slopes of up to 75 percent gradient with the assistance of winches. Masticators and equipment such as excavators capable of treating and piling fuel on steep slopes would also be utilized where appropriate.~~

## Alternative 1

Forest thinning treatments on 9,709 acres would utilize conventional ground-based equipment such as feller-bunchers and skidders, conventional non-ground-based equipment (for example, skyline yarders), harvesters, and forwarders, including those capable of operating on slopes of up to 75 percent gradient with the assistance of winches. Masticators and equipment such as excavators capable of treating and piling fuel on steep slopes would also be utilized where appropriate.

Table 1 below provides detailed information for proposed treatment activities within and outside of fuelbreak treatment areas that are identified as MSO and/or old growth habitat. Prescriptions for proposed activities would adhere to management direction and minimum habitat requirements identified in the 2012 Mexican Spotted Owl Recovery Plan to maintain or reach minimum requirements for each designation for MSO.

**Table 2. Habitat designations within proposed treatment areas**

MSO and Old-Growth Habitat Components in Proposed Treatment Areas		Potential Natural Vegetation Forest Types within Pueblo Ridge Project Area					
		Ponderosa Pine	Douglas-fir	White fir	Spruce-fir	Aspen	Pinyon-Juniper
Proposed Treatments in MSO Habitat	Recovery Habitat		1,049 acres				
	Nest/Roost Habitat		203 acres				
	Add Nest/Roost Habitat		249 acres				
	Nest/Roost and Old Growth Habitat		209 acres				
	Add Nest/Roost and Old Growth Habitat		151 acres				
Proposed Treatments in MSO Habitat	Recovery Habitat		729 acres	595 acres	26 acres	214 acres	
	Nest/Roost Habitat		119 acres	25 acres			



Within Proposed Fuelbreaks	Add Nest/Roost Habitat		274 acres				
	Nest/Roost and Old Growth Habitat		6 acres				
	Add Nest/Roost and Old Growth Habitat		5 acres				
Proposed Treatments in Old Growth Habitat	Outside of MSO Habitat	653 acres					869 acres

**Page 79, The section entitled “Affected Environment”.** The section is updated as follows to further clarify the existing condition to contrast Alternative 1:

~~Approximately 3,855 acres of mixed conifer exist within the project area (table 3). Existing vegetation structural stage distribution for mixed conifer in the project area is largely dominated by small to medium size classes, with nearly 76 percent of mixed conifer occurring in stands from 5 to 18 inches diameter. Less than 20 percent of mixed conifer is available in the largest size classes.~~

**Table 3. Mixed conifer vegetation structural size classes within Mexican spotted owl habitat within the project area.**

<b>Vegetation Structural Size Class</b>	<b>Acres</b>	<b>Percent of Existing Mixed conifer</b>
1	138	3.6
2	0	0
3	1,044	27.1
4	1,942	50.4
5	561	14.6
6	170	4.4
Total	3,855	100

Approximately 3,855 acres of mixed conifer exist within the project area. Existing VSS distribution for mixed conifer in the project area is largely dominated by moderate to dense stands in medium size classes with nearly 64% of mixed conifer occurring in stands from 5 to 18 inches diameter with canopy cover 60 percent or greater (3C, 4B, and 4C VSS classes; Table 20). Less than 85 acres (5%) of mixed conifer consists of dense stands in size classes 18 inches diameter or greater (VSS 5C, 6C; Trees < 18 inches dbh, canopy cover ≤60%) described by Ganey et al. (2003) as meeting Mexican spotted owl nesting habitat structural requirements in mixed conifer (table 20). By comparison, the Carson National Forest contains an estimated 8,500 acres of stands with diameters 20 inches or greater, 60 percent or greater canopy, in mixed conifer.

**Table 20. Mixed conifer vegetation structural size classes within within the project area.**

<b><u>Vegetation Structural Size Class</u></b>	<b><u>Acres</u></b>	<b><u>Percent of Existing Mixed Conifer</u></b>
<u>1</u>	<u>138</u>	<u>3.6</u>
<u>2</u>	<u>0</u>	<u>0</u>
<u>3A</u>	<u>124</u>	<u>3.2</u>
<u>3B</u>	<u>395</u>	<u>10.2</u>
<u>3C</u>	<u>529</u>	<u>13.7</u>
<u>4A</u>	<u>0</u>	<u>0</u>
<u>4B</u>	<u>993</u>	<u>25.8</u>
<u>4C</u>	<u>945</u>	<u>24.5</u>
<u>5A</u>	<u>14</u>	<u>0.4</u>
<u>5B</u>	<u>503</u>	<u>13.0</u>
<u>5C</u>	<u>44</u>	<u>1.1</u>
<u>6A</u>	<u>0</u>	<u>0</u>
<u>6B</u>	<u>131</u>	<u>3.4</u>
<u>6C</u>	<u>39</u>	<u>1.0</u>
<u>TOTAL</u>	<u>3,855</u>	<u>100.0</u>

Clarification of the forest plan management direction for Mexican Spotted Owl protected activity centers because no protected activity centers exist in the project area.

Page 24, The section entitled “Project Design Features Common to Both Alternatives, Mexican Spotted Owl”. Insertation of a clarifying footnote. The section is updated as follows:

“Mexican spotted owl protected activity centers do not currently exist within the project area. Should the need arise to establish a protected activity center during project implementation, this project design feature would apply.”

## Clarification of the proposed silvicultural treatments.

**Page 11, The section entitled “Alternatives, Vegetation and Fuels Treatment, Alternative 1”.** The inclusion of the additional paragraph below and insertion of table 2. The section is updated as follows:

Site-specific prescriptions would be developed during the implementation phase of this project to meet desired conditions while assuring habitat components and structural attributes are met. Table 2 below provides information on potential silvicultural prescriptions that would be considered to meet the purpose and need of the project.

**Table 2. Potential silviculture prescriptions by forest type, habitat, and old growth designations**

<b><u>Proposed Silvicultural Treatments by Forest Type and Habitat Components</u></b>	<b><u>Estimated Treatment Acres by Potential Natural Vegetation Forest Type</u></b>
<p><u>Uneven-aged Management in conifer areas outside of MSO habitat, old growth, aspen, oak, and riparian areas.</u></p> <p><u>Including but not limited to group selection, individual tree Selection, free thinning, and thin from Below</u></p> <p><u>Retention levels of 40 – 80 ft<sup>2</sup>/acre with an average basal area of 60 ft<sup>2</sup>/acre.</u></p>	<p><u>Ponderosa Pine - 1,843 acres</u></p> <p><u>White fir - 279 acres</u></p> <p><u>Pinyon-Juniper - 1,484 acres</u></p>
<p><u>Uneven-aged Management on acres proposed for fuelbreaks (Within MSO Recovery Habitat)</u></p> <p><u>Including, but not limited to thin from below, free thinning, individual tree selection, weeding, liberation cuts, and small patch cuts.</u></p> <p><u>Residual retention level of 40% canopy cover. Thin down to a residual basal area ranging from 30 – 120 ft<sup>2</sup>/acre with majority of average BA within 60ft<sup>2</sup>/acre. Retention of trees 18” DBH and larger where appropriate.</u></p>	<p><u>Douglas-fir – 729 acres</u></p> <p><u>White fir – 595 acres</u></p> <p><u>Spruce-fir – 26 acres</u></p> <p><u>Aspen – 214 acres</u></p>
<p><u>Uneven-aged Management in Aspen forest type.</u></p> <p><u>Including but not limited to weeding, liberation cuts, and thin from above</u></p> <p><u>Retention of live aspen and at least 3 – 6 large diameter conifers 18” DBH and larger for snag and down-woody materials recruitment</u></p>	<p><u>Aspen - 174 acres</u></p>
<p><u>Thin from Below in Old Growth Habitat</u></p> <p><u>Basal area and tree per acre retention requirements by forest type in Table 1 of Appendix A.</u></p> <p><u>For Ponderosa Pine: Manage for 20 trees per acre ranging from 14 – 18” DBH/DRC with a total basal area of 70 - 90 ft<sup>2</sup>/acre.</u></p> <p><u>For Pinyon-Juniper: Manage for 12 – 30 trees per acre ranging from 9 – 12” DBH/DRC with a total basal area of 6 – 24 ft<sup>2</sup>/acre.</u></p>	<p><u>Ponderosa pine - 653 acres</u></p> <p><u>Pinyon-Juniper - 869 acres</u></p>

<u>Uneven-aged Management in MSO Recovery Habitat.</u>  <u>Including but not limited to Group Selection, Individual Tree Selection, Free Thinning, and Thin from Below</u>  <u>Retention levels of 40% canopy cover. Retention of trees &gt;24" DBH unless considered a threat to human life and property. Thin down to a residual basal area ranging from 35 – 120 ft<sup>2</sup>/acre with majority of average BA within 60 – 80 ft<sup>2</sup>/acre.</u>	<u>Douglas-fir – 1,049 acres</u>
<u>Uneven-aged Management in MSO Nest/Roost Habitat, Add Nest/Roost Habitat (Also includes acres that overlap with acres proposed for treatment with fuelbreak and old growth designation).</u>  <u>Including but no limited to free thinning, individual tree selection, and thin from below.</u>  <u>Minimum basal area retention level of 120 ft<sup>2</sup>/acre while retaining at least 30% of the basal area in both the 12 – 18" DBH and 18"+ DBH ranges.</u>	<u>Douglas-fir – 1,216 acres</u>  <u>White fir – 25 acres</u>

## Clarification of restoration and the effects of riparian restoration and aspen restoration.

**Page 13, Section entitled “Restoration Treatments, Both Alternatives”.** This section is updated as follows:

### ~~1.5.2.1.Both Alternatives~~

~~Up to 10.5 miles (approximately 32 acres) of riparian restoration treatments along streams within the project area and adjacent to the Rio Fernando in the La Sombra and Capulin Campgrounds would improve riparian habitat (see **Error! Reference source not found.**). Treatments could include conifer removal, ladder fuel reduction, and interconnected canopy reduction. Aspen restoration treatments would occur on 481 acres throughout the project area including in the fuelbreaks. These treatments would selectively remove conifers within aspen stands and within 150 feet of aspen stands to increase aspen regeneration. Fuels remaining on site would be treated through prescribed fire or mechanical means to further promote aspen regeneration.~~

### 1.5.2.1Both Alternatives

Up to 10.5 miles (approximately 32 acres) of riparian restoration treatments along streams within the project area and adjacent to the Rio Fernando in the La Sombra and Capulin Campgrounds would improve riparian habitat (see **Error! Reference source not found.**). Treatments could include conifer removal, ladder fuel reduction, and interconnected canopy reduction. Aspen restoration treatments would occur on 481 acres throughout the project area including in the fuelbreaks. These treatments would selectively remove conifers within aspen stands and within 150 feet of aspen stands to increase aspen regeneration.

Treatments may be performed mechanically with machinery such as a self-leveling feller buncher with a cutting and delimbing head or a mastication head. Other treatments would entail hand thinning, lopping and scattering materials, or piling and burning materials outside of the riparian zone. All treatment methods would follow best management practices. Fuels remaining on site

would be treated through prescribed fire or mechanical means to further promote aspen regeneration.

**Page 46, Section entitled “Environmental Consequences”.** This section is updated as follows:

#### **2.1.3.1 Direct and Indirect Effects – Alternative 1**

~~A direct effect of alternative 1 would be a reduction in live tree density in most size classes. This would increase growing space and availability of water, nutrients, and sunlight to residual trees. The number of shade-tolerant tree species, especially in the smaller diameter classes, would be reduced. The number of smaller trees that are considered ladder fuels would be decreased. Canopy spacing and bulk densities would be reduced. Conifer densities would be reduced in aspen areas, which would promote greater aspen regeneration potential.~~

~~Indirectly, residual trees in treated areas would grow in an environment with reduced stress, resulting in decreased competition-related mortality. In addition, the treated areas would be more resistant to diseases and insects, especially bark beetles, due to increased tree vigor (Oliver and Uzoh 1997).~~

~~Alternative 1 would reduce the density of trees in the project area. Overall, relative density would be reduced from 70.8 percent to approximately 39.4 percent (see **Error! Reference source not found.** and **Error! Reference source not found.**). This reduction in density takes the project area from a level where trees are dying from competition to a level where stands are still considered to be fully stocked and free to grow. Densities would remain higher in old growth, Mexican spotted owl areas, and goshawk areas but would still be lower than existing condition densities. Species dominance of shade-tolerant species would be increased by alternative 1. While not as dramatic a change as with density, shade-intolerant basal area would increase from approximately 71.3 percent to 79.0 percent if the proposed action is implemented.~~

#### **2.1.3.1 Direct and Indirect Effects - Alternative 1**

A direct effect of alternative 1 would be a reduction in live tree density in most size classes. This would increase growing space and availability of water, nutrients, and sunlight to residual trees. The number of shade-tolerant tree species, especially in the smaller-diameter classes, would be reduced. The number of smaller trees that are considered ladder fuels would be decreased. Canopy spacing and bulk densities would be reduced. Conifer densities would be reduced in aspen areas, which would promote greater aspen regeneration potential.

Indirectly, residual trees in treated areas would grow in an environment with reduced stress, resulting in decreased competition-related mortality. In addition, the treated areas would be more resistant to diseases and insects, especially bark beetles, due to increased tree vigor (Oliver and Uzoh 1997).

Alternative 1 would reduce the density of trees in the project area. Overall, relative density would be reduced from 70.8 percent to approximately 39.4 percent (see **Error! Reference source not found.** and **Error! Reference source not found.**). This reduction in density takes the project area from a level where trees are dying from competition to a level where stands are still considered to be fully stocked and free to grow. Densities would remain higher in old growth, Mexican spotted owl areas, and goshawk areas but would still be lower than existing condition densities. Species dominance of shade-tolerant species would be increased by alternative 1. While not as dramatic a

change as with density, shade-intolerant basal area would increase from approximately 71.3 percent to 79.0 percent if the proposed action is implemented.

Age and size class diversity of native deciduous trees and shrubs would be improved by removing non-native vegetation and encroaching conifers from riparian zones. Early-seral species distribution would increase and late-seral species densities would decrease following implementation, leading to improved habitat and riparian functioning condition with recruitment of hardwoods.

Treatments in the aspen forest type would reduce stand densities of encroaching shade-tolerant, late-seral conifers. Aspen regeneration would be triggered by implementing prescriptions tied to conifer removal and fuels treatment with prescribed fire. Wildlife habitat would be improved with the recruitment, establishment and maintenance of aspen populations while creating a patchy mosaic within the project area and disrupting aerial and surface fuel continuity.